CLAIMS

1. A decoder for a wireless communication device comprising a calculator for calculating the modulo of a linear approximation of a MAX* function; and a selector for selecting a MAX* output value from the group a(n)modF, b(n)modF, and the calculated modulo based upon a determination as to whether a predetermined threshold value for $|a(n)-b(n)|$ has been met, where a(n) is a first state metric, b(n) is a second state metric, C is the predetermined threshold value and F is a value greater than $|a(n)-b(n)|$ whereby to enable the calculator to calculate the modulo of the linear approximation of the MAX* function using a $\bmod F$ function of $a(n) \bmod F$, $b(n) \bmod F$ and C.

2. A decoder according to claim 1, wherein the calculator is arranged to calculate the modulo of the linear approximation of the MAX* function using: $\left(a(n) \bmod F + \frac{((b(n) \bmod F - a(n) \bmod F) \bmod F + C)}{2}\right) \bmod F$.

3. A decoder according to claim 1, wherein the calculator is arranged to calculate the modulo of the linear approximation of the MAX* function using:

$\left(\left(\frac{(a(n) \bmod F + C) \bmod F + b(n) \bmod F}{2}\right) \bmod F + F * s\right) \bmod F$, where s is equal to [a(m) XOR b(m)] AND [((a(m) XOR a(m-1)) and ((b(m) XOR b(m-1)] and a(m) b(m) a(m-1) and b(m-1) are the most significant bits of a(n) b(n) a(n-1) and b(n-1) respectively.

4. A decoder according to any preceding claim, wherein the determination is based upon the sign of *(a(n)modF–b(n)modF–C)modF* and the sign of *(b(n)modF–a(n)modF–C)modF.*

5. A decoder according to any preceding claim, wherein the selector is arranged to select and output the modulo of the linear approximation of the MAX* function if the value $|a(n)-b(n)|$ is less than the predetermined threshold value.

6. A decoder according to any preceding claim, wherein the value of F is to the power of two.

7. A decoder according to any preceding claim, wherein the selector is a multiplexer.

8. A decoder according to any preceding claim, wherein the calculator is an add module that is arranged to receive a(n)modF, b(n)modF and C.

9. A method for generating a MAX* value, the method comprising receiving a first modulo state metric a(n)modF, a second modulo state metric b(n)modF and a predetermined threshold value C for $|a(n)-b(n)|$, where F is a value greater than $|a(n)-b(n)|$ whereby to enable the modulo of a linear approximation of a MAX* function to be calculated using a $\bmod F$ function of $a(n)\bmod F$, $b(n)\bmod F$ and C; and selecting a value from the group a(n)modF, b(n)modF, and the calculated modulo based upon a determination

as to whether the predetermined threshold value C for $|a(n)-b(n)|$ has been met.

10. A method according to claim 9, wherein the modulo of the linear approximation of the MAX* function is calculated using: $\left(a(n)\bmod F+\frac{((b(n)\bmod F-a(n)\bmod F)\bmod F+C)}{2}\right)\bmod F$.

11. A method according to claim 9, wherein the modulo of the linear approximation of the MAX* function is calculated using: $\left(\left(\frac{(a(n)\bmod F+C)\bmod F+b(n)\bmod F}{2}\right)\bmod F+F*s\right)\bmod F$, where s is equal to [a(m) XOR b(m)] AND [((a(m) XOR a(m-1)) AND ((b(m) XOR b(m-1)].